

APPLICATION AND CONSTRUCTION NOTES FOR LAPTRAYS AND ADAPTIVE POINTERS

Wobble Stick Toy Control
Adaptive Pointers
Slide-Away Laptray
Swing-Away Lapboard
Folding Communication Board



Trace Research and Development Center
For the Severely Communicatively Handicapped
University of Wisconsin-Madison

314 Waisman Center, 1500 Highland Avenue, Madison, Wisconsin 53706, 608/262-6966

WOBBLE STICK TOY CONTROL SWITCH

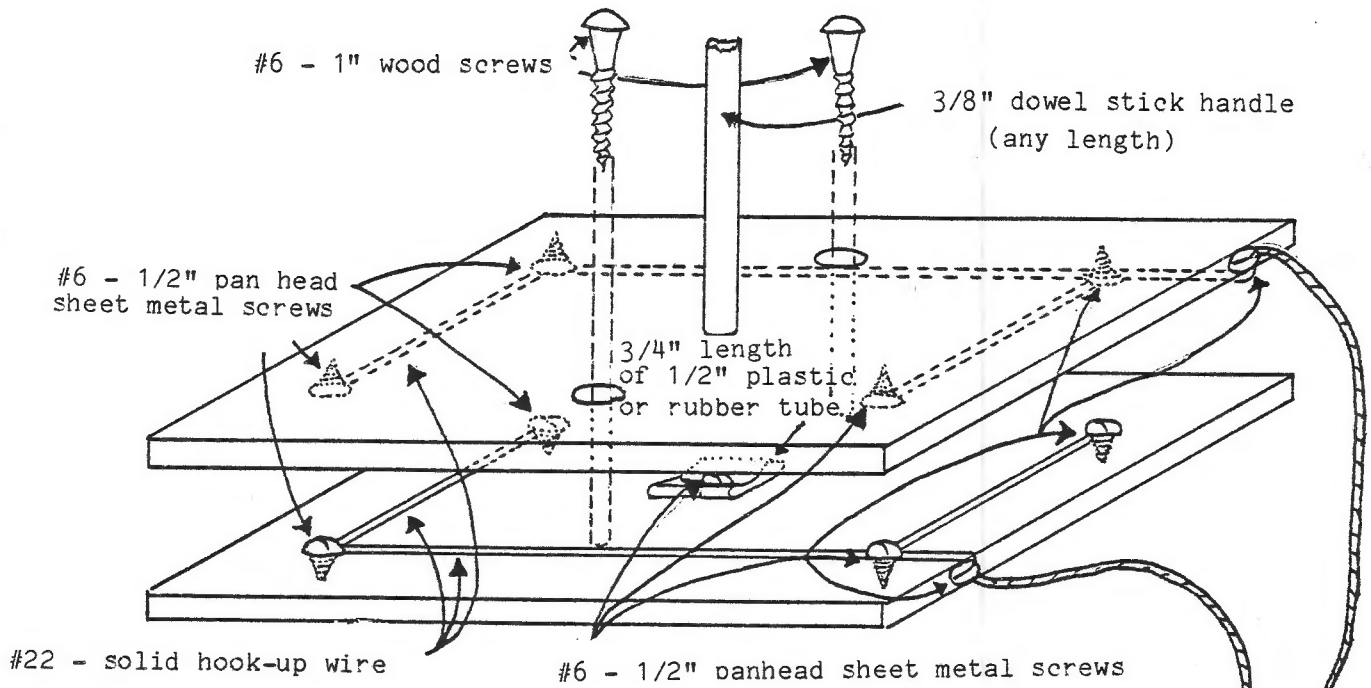
1980



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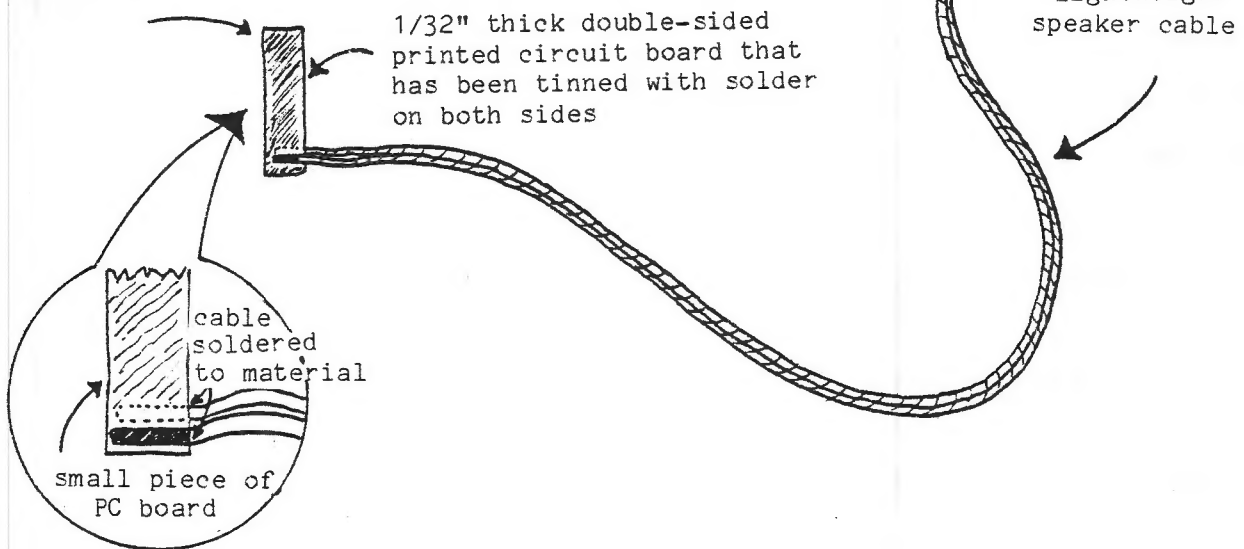
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WOBBLE STICK TOY CONTROL SWITCH



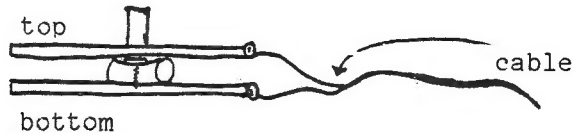
TOY CONTROL CONNECTOR

insert between batteries
in battery-operated toy
or device

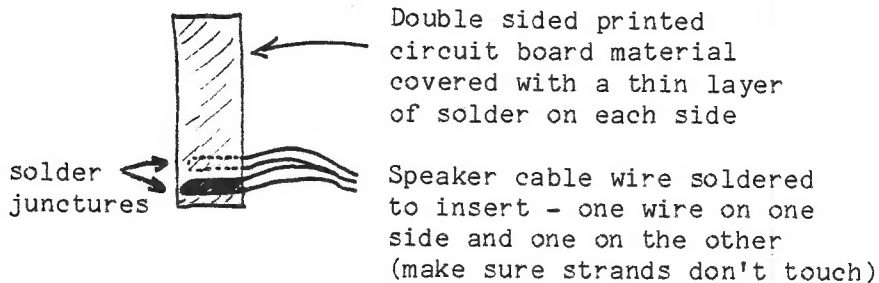


7) Assemble top and bottom by screwing #6 1" wood screws into 2 3/16" holes drilled in top (NOTE: top and bottom should be approximately 1/4" apart; separated by plastic or rubber tube; top should be loose and wobbly)

8) Attach lightweight speaker cable to top and bottom. One strand of wire connects to screw on outside edge of top while other strand attaches to screw on bottom:



9) Attach two strands of speaker cable to toy control connector (battery insert) by soldering wires to either side of insulated material. (NOTE: wires must not make contact with each other at solder junctures - tin the battery insert by coating both sides but not the edges with solder.)



drawings and text by Ben Brown 6/80

ADAPTIVE POINTERS

1980



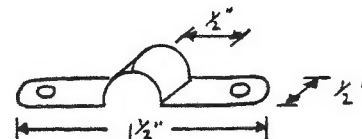
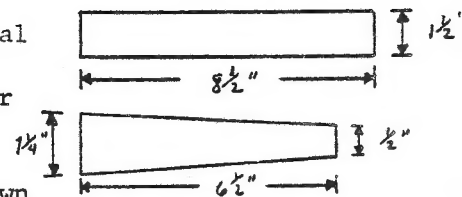
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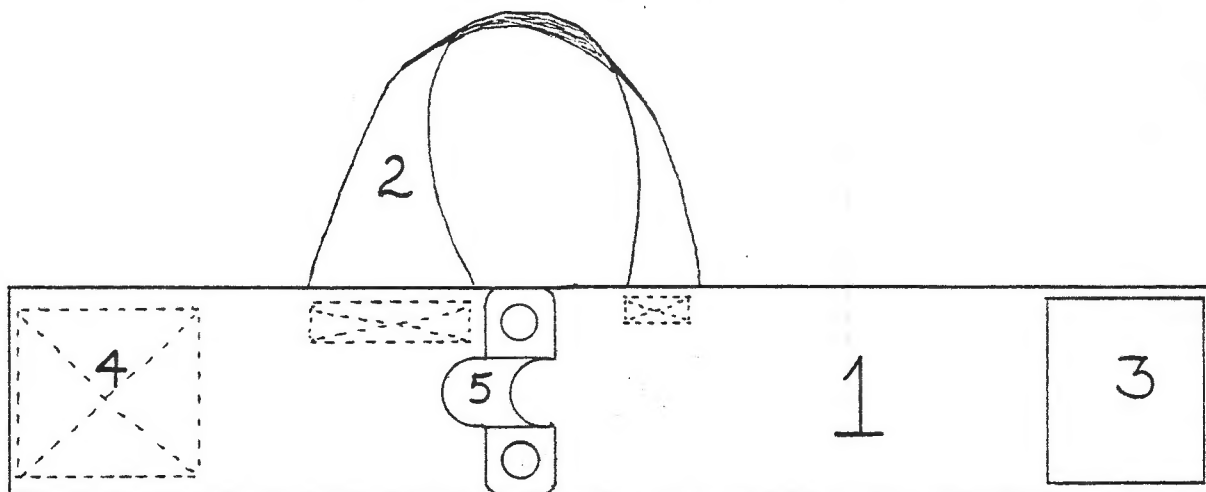
Wrist Strap Pointer*

Materials: (refer to drawing)

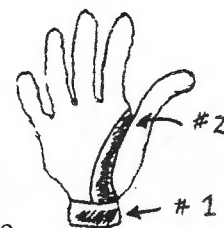
- #1 - $1\frac{1}{2}$ " x $8\frac{1}{2}$ " strip of imitation leather material
- #2 - $6\frac{1}{2}$ " strip of leather material cut on a taper with a width of $1\frac{1}{4}$ " to $\frac{1}{2}$ "
- #3 - $1\frac{1}{4}$ " x $1\frac{3}{4}$ " patch of velcro loops material sewn to outside surface of #1 strip
- #4 - $1\frac{1}{2}$ " x $1\frac{3}{4}$ " patch of velcro hooks material sewn to inside surface of #1 strip
- #5 - Plastic conduit clamp $\frac{1}{2}$ " x $1\frac{1}{2}$ "



Note: clamp should be attached to #1 strip with "speedy rivuts".



- Procedure:
1. Cut parts #1 and #2 out of imitation leather material
 2. Attach velcro patches to ends of #1 strip
 3. Attach strap to user's wrist
 4. Determine proper location of #2 by placing it around user's thumb
 5. Mark location of #2 strip with magic marker
 6. Sew #2 strip in place
 7. Attach conduit clamp to #1 strip using speedy rivuts (as shown in diagram)
 8. Place $\frac{1}{2}$ " x 1" or $1\frac{1}{2}$ " wooden dowel in conduit clamp - to be used as pointer
 9. Cut pointer to appropriate length (note: proper length determined after observing user pointing with the wrist strap.)



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*Designed by Mrs. Edward Merchen
of Danville, Illinois

The "Dolphin" Pointer

The "Dolphin" pointer was designed for use as an indicator when using a manual pointing board. The design is relatively simple and the materials are readily available at most hardware and fabric stores.

Materials

1. $\frac{1}{4}$ " x $5\frac{1}{8}$ " x $2\text{-}5\frac{5}{8}$ " piece of lexan sheet material
2. $\frac{1}{2}$ " x $6\text{-}3\frac{3}{4}$ " piece of lexan rod material
3. 3 strips of 1" x $5\frac{1}{2}$ " self-sticking velcro loop material
4. Small amount of epoxy glue

Procedure

1. Using the enclosed pattern (or your own design), trace the base on piece of lexan sheet material.
2. Cut out the base using a band saw or sabre saw. (Note: Make sure appropriate blade for cutting plastics is used with the sabre saw).
3. Measure and cut lexan rod material.
4. Using a heat gun, heat and bend lexan rod to appropriate shape. Configuration of handle can be tailored to user's needs.
5. Place handle on base and determine appropriate location for handle anchoring holes.
6. Drill 2 holes through base using $\frac{1}{2}$ " drill bit - appropriate for drilling through plastic. (Note: If possible, use a drill press set at the slowest speed).
7. Using a rat-tail file, ream out the holes so handle fits snugly.
8. Before gluing handle in place, decide whether "nose" of pointer will point left or right. Attach velcro to bottom of the base and trim around the edge. (Note: Velcro will serve as a "floor" for the handle holes when applying the epoxy.)
9. Secure the handle in place with epoxy.
10. Paint the "nose" with enamel (optional)

INSTRUCTIONS FOR FABRICATION AND ATTACHMENT
OF SLIDE-AWAY LAPTRAY

1982



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Instructions for Fabrication and Attachment of Slide-away Laptray

The slide-away laptray can be used on any wheelchair with standard length armrests. To use or store the tray requires the ability to grasp the edge of the tray and pull it from the down position to the up position, or vice versa.

Measurements:

Drawing #1 (page 2)

1. Measurement A = width of wheelchair (outside armrest to outside armrest) plus $2\frac{1}{2}$ inches.
2. Measurement B = desired length as determined by user's needs.
3. Measurement C = two-thirds the length of measurement B
4. Measurement D = depth of cut out - determined by measuring depth of user's chest, in sitting position, plus 1 inch.
5. Measurement E = width of cut out - determined by measuring width of user's chest, in sitting position, plus 1 inch.

Drawing #2 (page 3)

6. Measurement F = distance between armrests (outside edges).

Construction Hints:

1. Use $\frac{1}{2}$ inch AB grade plywood for laptray.
2. Use $\frac{1}{4}$ " x $\frac{1}{4}$ " white pine for edging around laptray.
3. Use $\frac{3}{4}$ " x 1" white pine for armrest braces.
4. Use $\frac{1}{8}$ " sheet of aluminum for armrest tongue.
5. Round all corners of laptray - sand with light grade sandpaper.
6. Apply 2 coats of polyurethane.
7. Attach armrest braces by drilling holes through top of tray - counter-sink screws - fill in holes with wood putty and sand smooth.

Re: construction of laptray straps: (See drawing #3)

1. Make straps from pressure sensitive velcro tape by sticking 2 pieces back to back.
2. Attach "D" ring end of strap to tray slide of armrest brace.
3. Attach other end of strap between armrest brace and tongue.

Re: attachment of laptray to wheelchair:

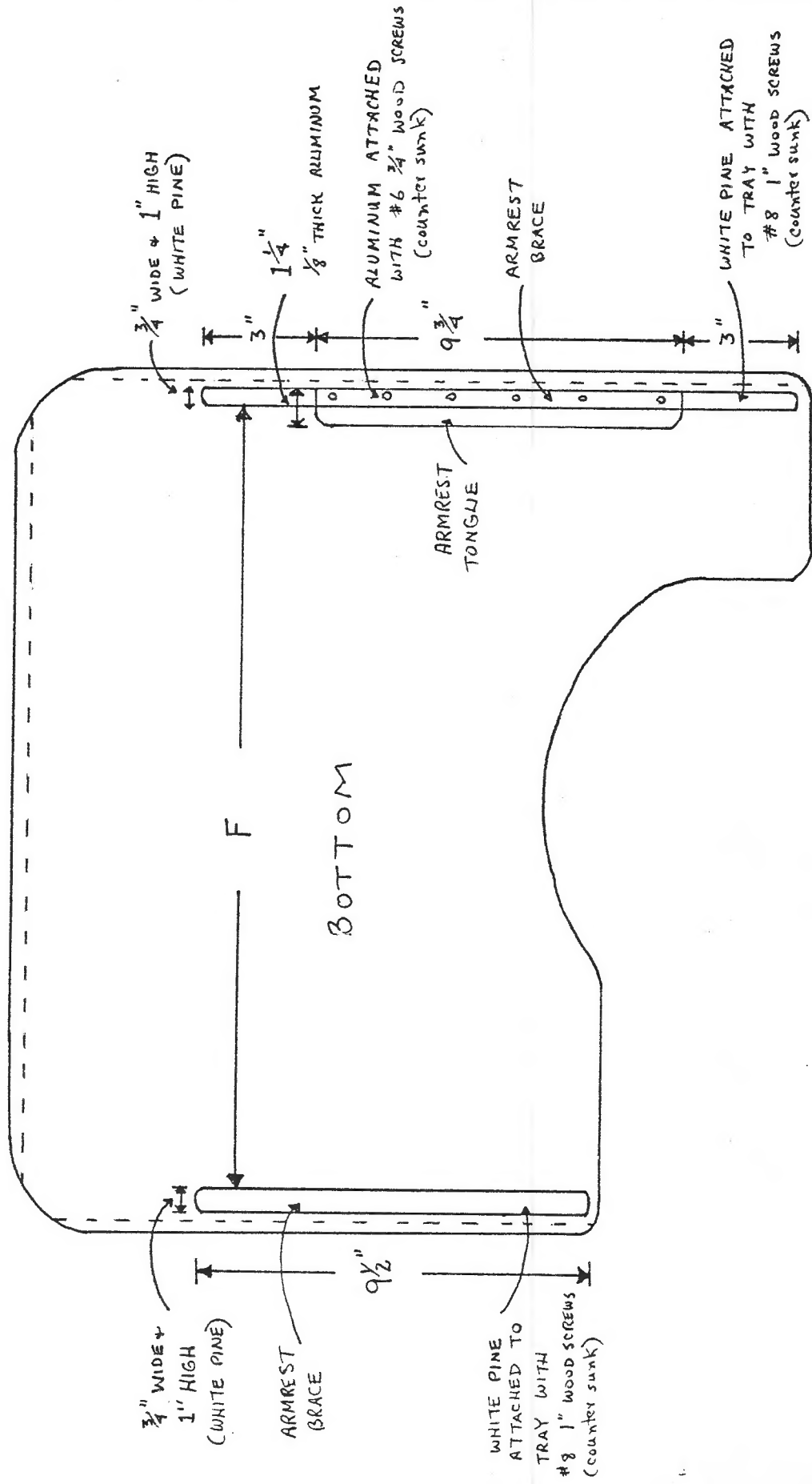
1. With straps unattached, place laptray on armrests with tongue and straps on that side underneath the armrest.
2. Allow "D" ring end of strap to rest on top of other armrest.
3. Connect straps by inserting longer straps through "D" rings and pull gently so that velcro hooks and loops engage.

Final notes:

1. The laptray can be designed to slide either to the user's left or right.
2. Nylon belt material and buckles can be used in place of the velcro straps and "D" rings.

SLIDE-AWAY LAPTRAY

(DRAWING #2)



INSTRUCTIONS
FOR
FABRICATION AND ATTACHMENT
OF
SWING-AWAY LAPBOARD
1982



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CONSTRUCTION NOTES

INTRODUCTION

The Fold Away Communication Board Support, pictured in Figure 1, provides a handicapped individual with a retractable communication board support for their wheelchair. The support is not designed to be used as a laptray; therefore, no objects over 2 or 3 pounds should be placed on the support surface. The support can be folded up in front of the user when the communication board is needed, and down to the side of the wheelchair when finished, with a minimum amount of strength and dexterity on the part of the user. The retractable nature of the support is very useful in easily moving the communication board out of the way during transfers and working at normal tables, while still keeping the communication board within easy reach of the user. The support is constructed of a very strong material which is also transparent allowing communication boards to be mounted on the bottom of the support.

Construction of the support can be done mostly with locally available materials and common woodworking tools. The support was designed to be used with Everest and Jennings (E & J) wheelchairs with adjustable desk-length armrests. It could be fitted to other wheelchairs as long as the armrest dimensions are the same as an E & J wheelchair. It is recommended that the assembly procedure be read completely to understand the entire construction process before purchasing and assembling the materials. The dimensions given are for a right handed support (where the support mounts to the right arm of the wheelchair), but can easily be converted to a left handed support if required by the individual. The side the support is mounted to may be dependent upon the side the user transfers from or the side a motorized wheelchair controller is mounted to. Some changes in the dimensions may be required if special modifications have been made to the wheelchair. Figure 2 shows the relative positions of the different parts to each other.

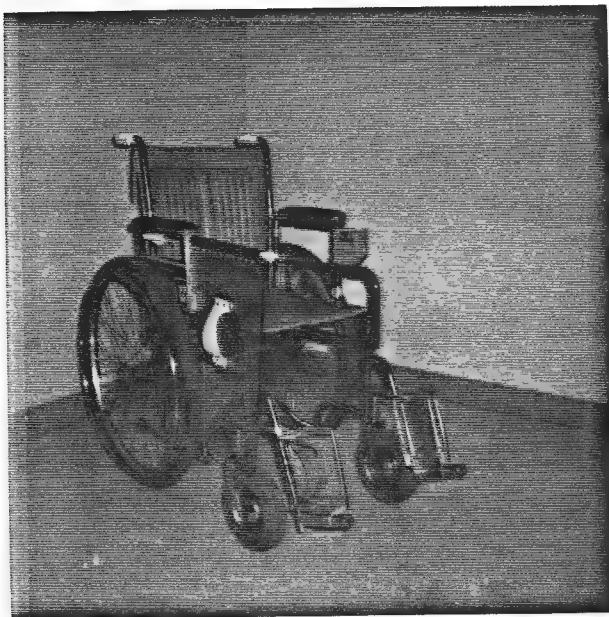


Fig. 1 Foldaway Communication Board Support

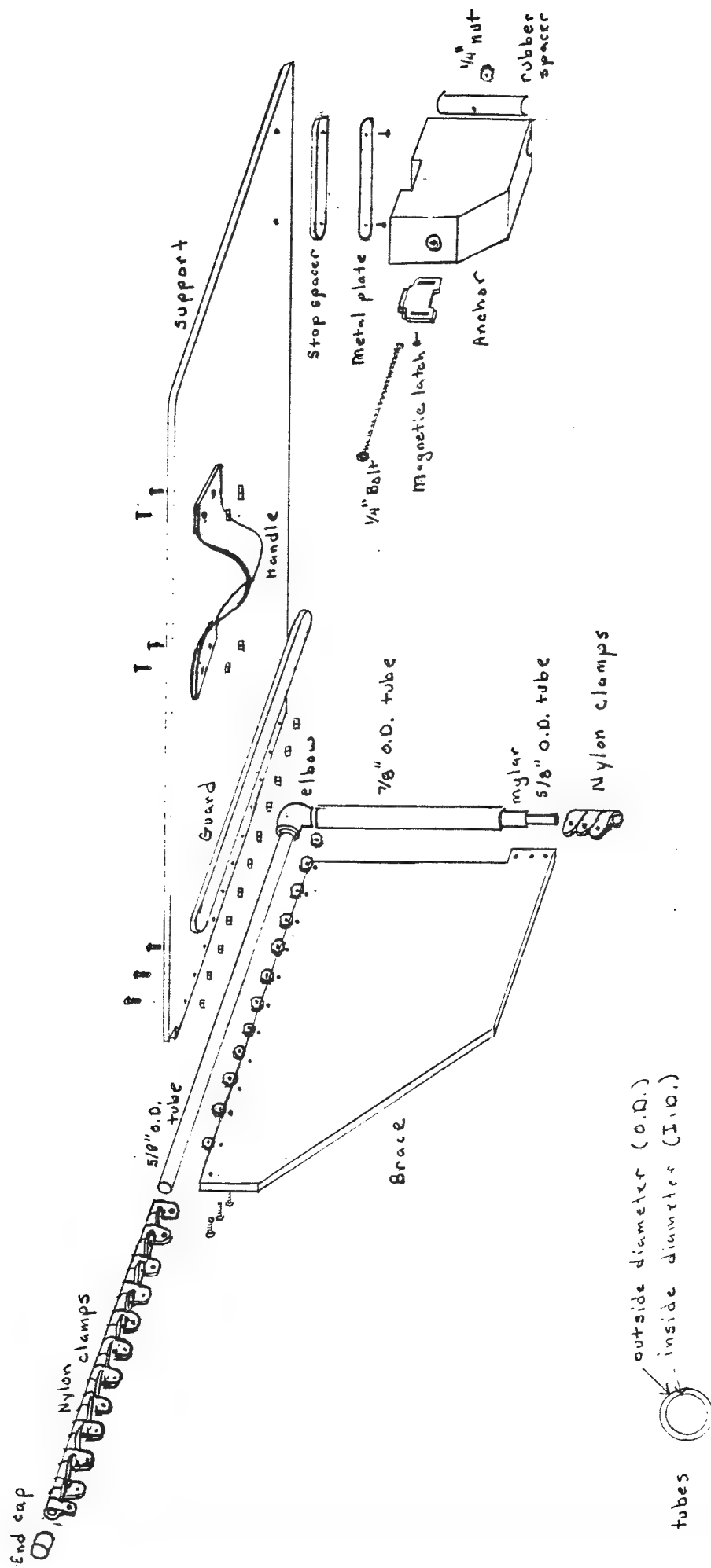


Fig. 2 Fold Away Communication Board Support

1	1/4"	nut
1	1" X 4" X 1/16"	iron plate ²
1	1 1/2" X 3 1/2" X 6"	finished pine 2 by 4
1	8" X 2"	cloth strip (i.e. canvas, webbing material)
1	9 " X 2"	10 mil. thick mylar sheet ³
1	plastic 1" wide	magnetic cabinet latch
1	3 1/2" X 1 3/8" X 1/16"	piece of rubber (i.e. inner tube)
26	9/16"	nylon clamps #8947 H.H. Smith ⁴
2	AF-2	Zygo aluminum clamps
1		broom clamp

¹ Can be cut from the 12" X 12" X 1/4" piece.

² Iron brackets used for joining wood together can be cut to the dimensions required and used for the iron plate.

³ Included with these instructions

⁴ Purchase at least 10 extra clamps as replacements in case some clamps break.

Distributors

ZYGO AF-2 clamps
(approximately \$21/2 clamps)

ZYGO Industries
P.O. Box 1008
Portland, OR 97207
(503) 297-1724

nylon clamps #8947 H.H. Smith
(approximately \$5/100 clamps)

Ohm/Electronics Inc. (\$5 min. order)
P.O. Box 368
Palatine, IL 60067
(312) 359-5500

Bell Industries (100 piece min.)
3422 W. Toughy Ave
Chicago, IL 60645
(800) 323-7617

polycarbonate sheet

Central Plastics
2701 N. Pulaski Rd.
Chicago, IL 60639
(312) 235-3300

Midland Plastics
3605 N. 126th Str.
Brookfield, WI 53005
(414) 781-6520

Central Plastics
5248 27th Ave
Rockford, IL 61101
(815) 397-4465

Cadillac Plastic & Chemical
4821 N. 32nd Str
Milwaukee, WI 53209
(414) 444-7650

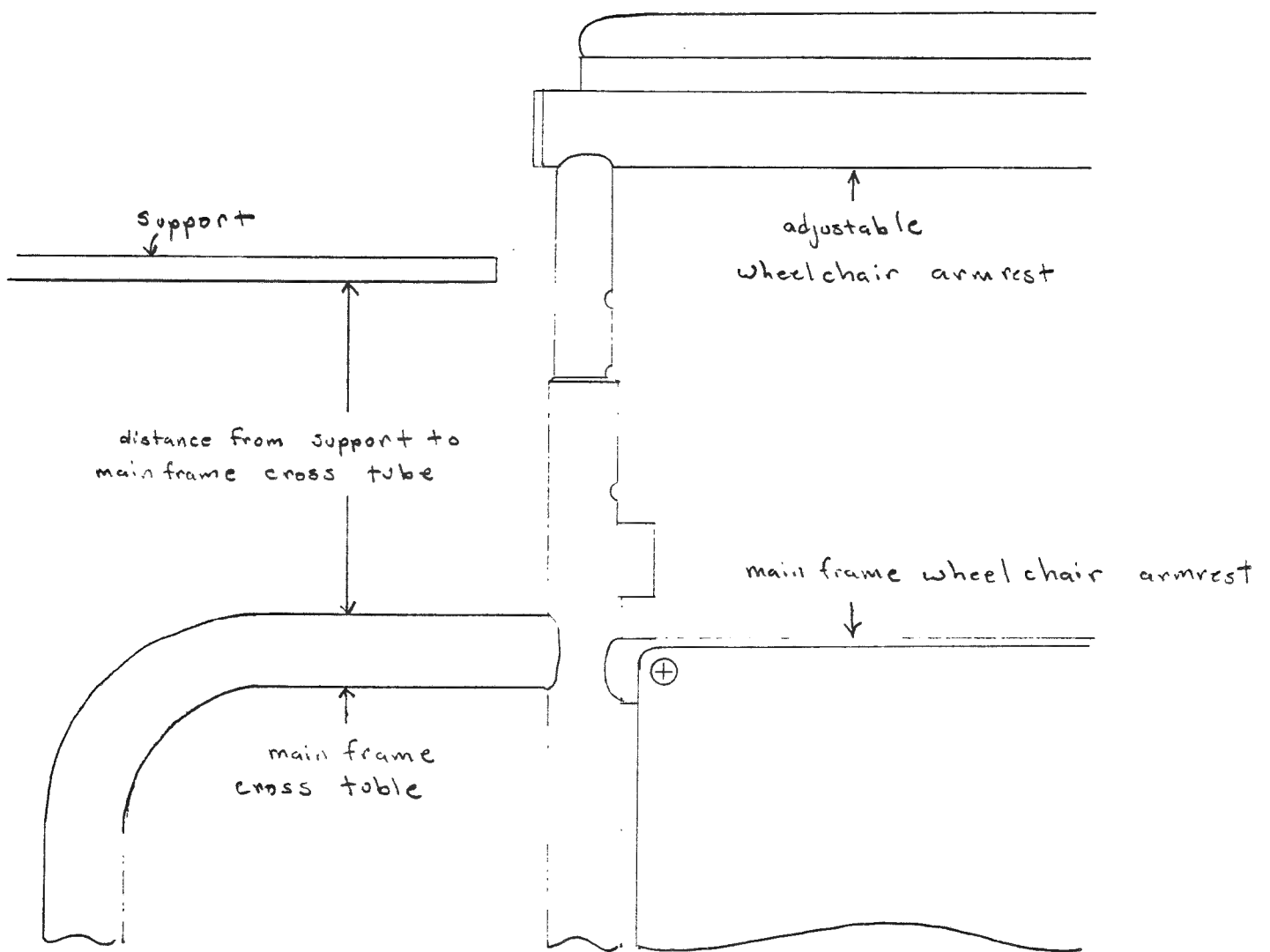


Fig. 3 Distance measurement of support above main frame cross tube.

- 4) Cut a $1/4"$ X $1/2"$ notch at corner H and remove sharp corner at I by filing it slightly (Fig. 5).
- 5) Drill 11 holes centered $1/4"$ from side HI beginning $3/4"$ from side IJ and continuing at $1"$ intervals to side KH using a $5/32"$ drill bit (Fig. 5)
- 6) Round off the corners and edges of the $11\ 1/2"$ X $1"$ Lexan guard and attach it to the bottom side of the support $3/4"$ from side HI and $1/4"$ from side IJ with polycarbonate adhesive (Fig. 5).

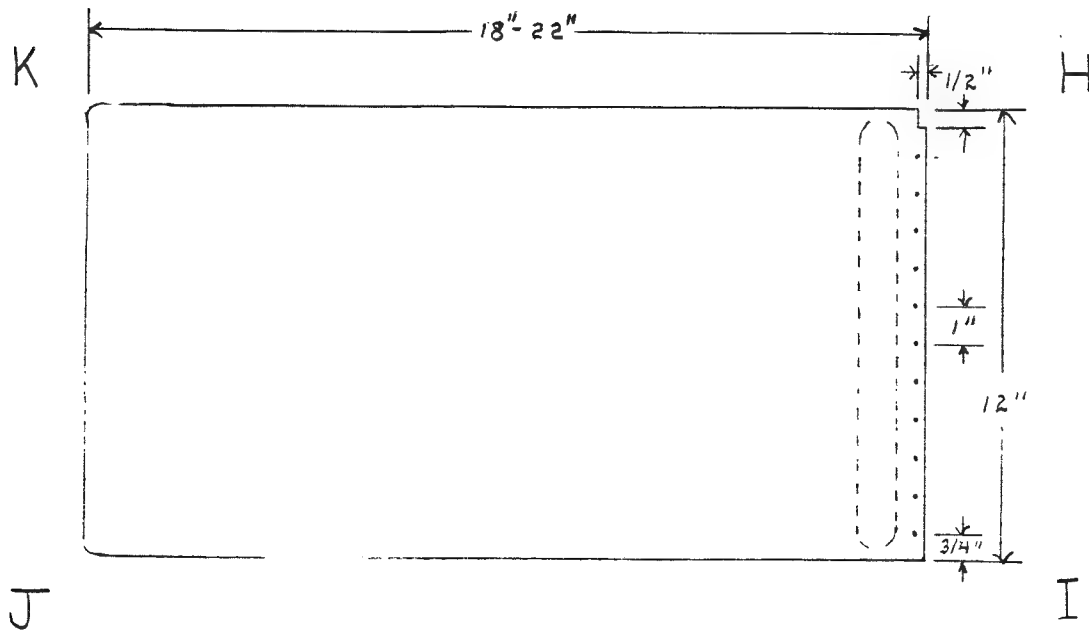


Fig. 5 Laptray (top view, look down through support)

- 7) Round off the ends of the $1"$ X $4"$ Lexan spacer and iron plate with a $1/2"$ arc and file off the sharp edges (Fig. 6).
- 8) Using polycarbonate adhesive, attach the $1"$ X $4"$ Lexan spacer to the support $1/2"$ from side JK and $1/2"$ from side IJ and allow time to completely dry. The long side of the spacer and the long side of the support should be parallel to each other (Fig. 6).
- 9) Place the $1"$ X $4"$ iron plate on the matching Lexan spacer cemented onto the support. Drill and countersink two $1/8"$ holes centered on the spacer and $1/2"$ from each end of the iron and $3/8"$ into the Lexan (Fig. 6).
- 10) Use two #6 X $3/8"$ flat head sheet metal screws to fasten the iron plate onto the Lexan.

- 3) Slide 23 of the nylon clamps onto the 12 1/2" arm of 5/8" O.D. PVC tubing attached to the elbow. Begin with a clamp for the brace and alternate the orientation of the clamps so that the brace is aligned with the inside part of the tube and the support is aligned to the bottom part of the tube (Fig. 8).
- 4) Cement the PVC cap on to the end of the tube holding the clamps.
- 5) Using 6-32 X 1/2" pan head machine screws and nuts, attach the support to the 12 1/2" arm and the brace to the 11 1/2" arm, with the heads of the screws facing the top of the support and the inside of the brace (Fig. 8).
- 6) Cut the 9" X 2" piece of mylar a little less than the length of the 7/8" O.D. tube and then fold into thirds along the long axis and create two sharp creases.
- 7) Slide the 7/8" O.D. tube onto the remaining 5/8" O.D. tube attached to the elbow with the sheet of mylar in between the 7/8" O.D. tube and the 5/8" O.D. tube to provide friction for stability (Fig. 7).
- 8) Slide on and attach 3 nylon clamps to the brace as in instructions 3 and 5 of this section.

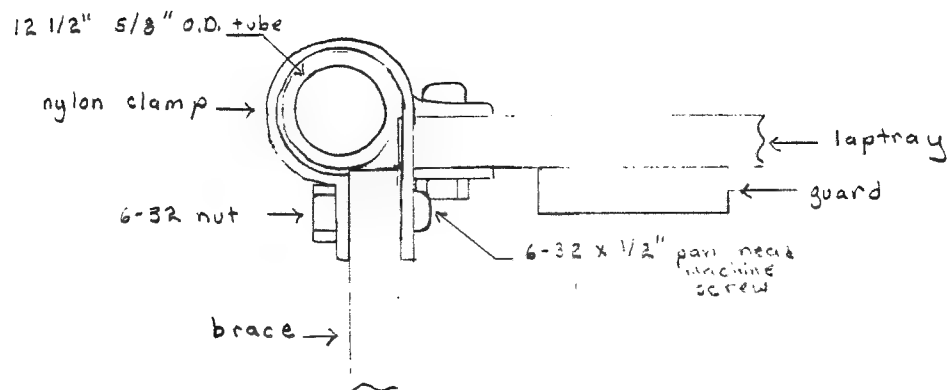


Fig. 8 Front view of nylon clamp assembly

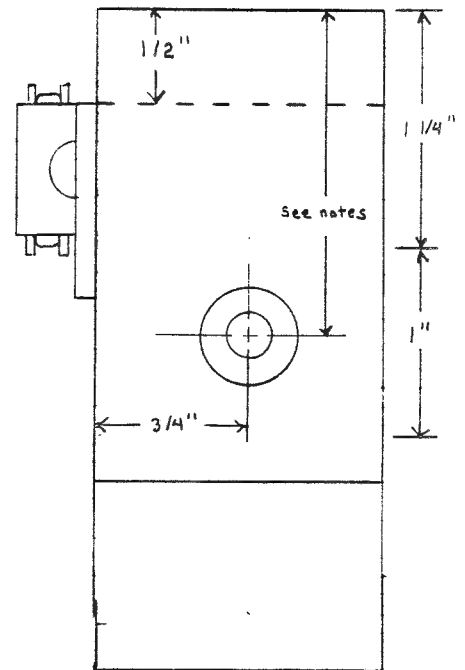
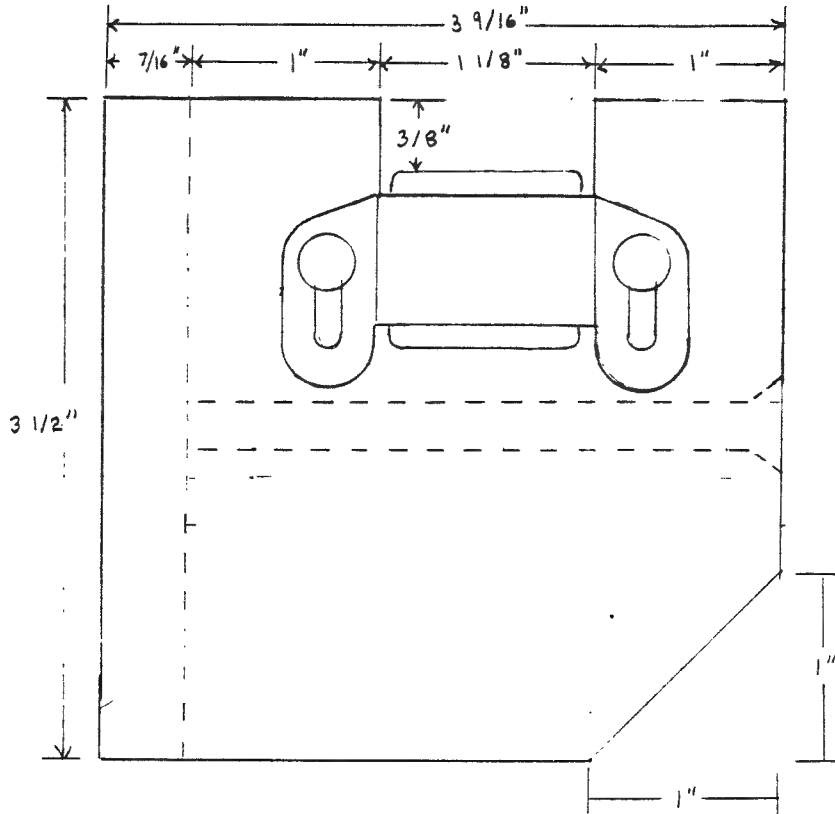
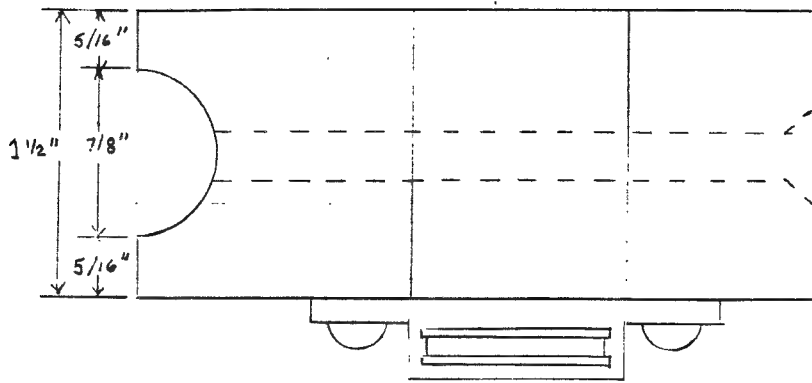


Fig. 9 Anchor

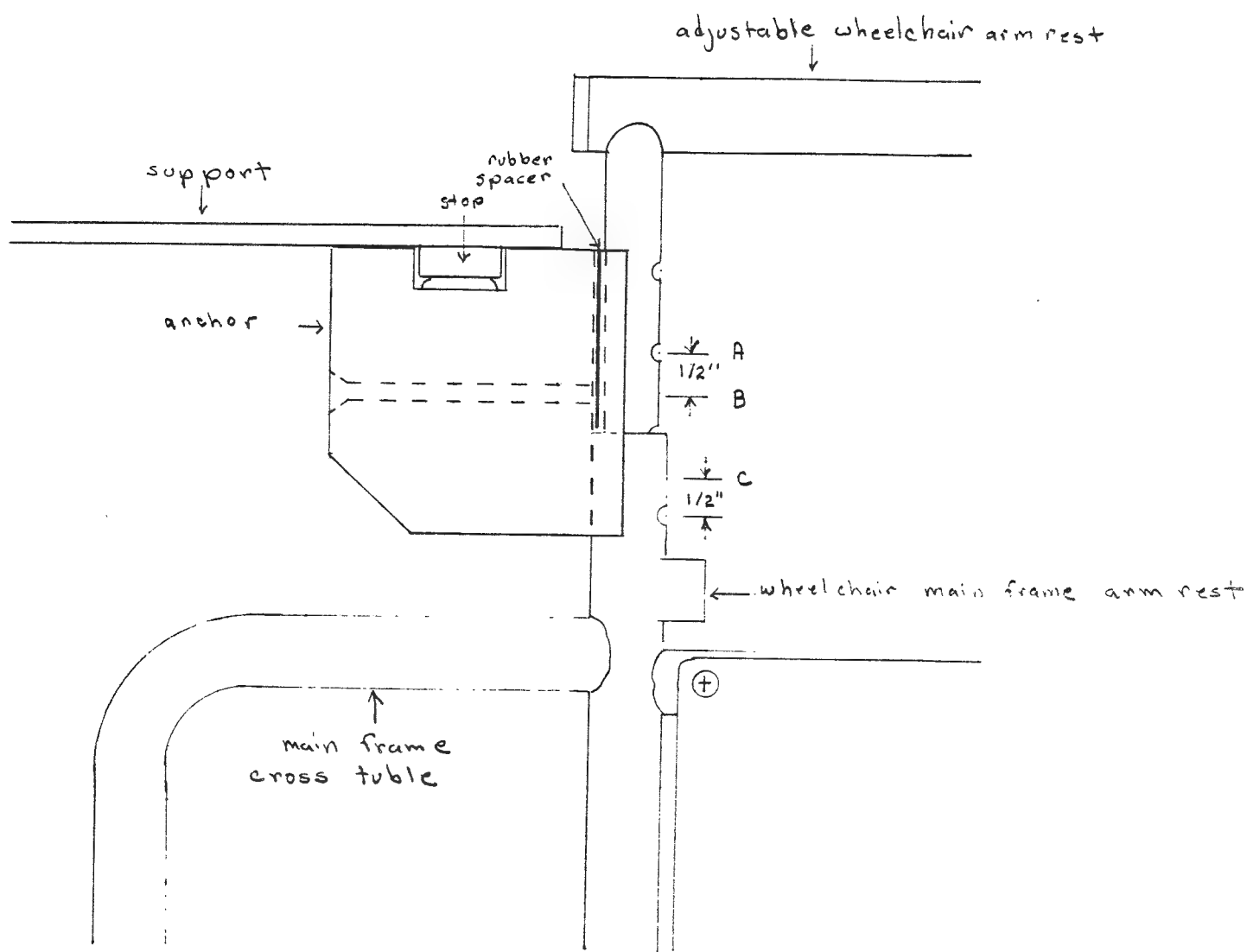
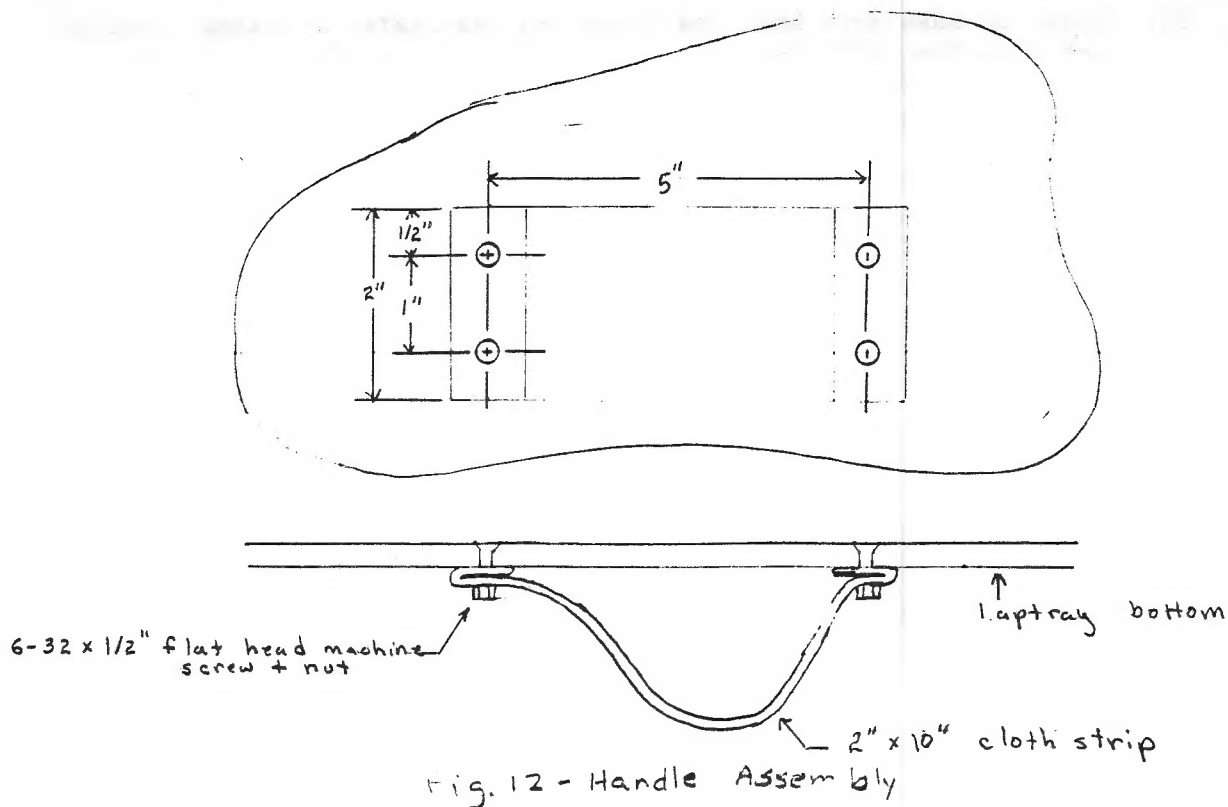


Fig. 11 Anchor placement (left arm view)



Broom Clamp

- 1) Open the support and make the brace flush with the wheelchair arm. Mark the position for the broom clamp to attach to the wheelchair frame (Fig. 13).
- 2) Drill and countersink one $3/16$ " hole on the brace 3" from side GH of the brace, centered in the middle of the cross tube on the main frame of the armrest (Fig. 13).
- 3) Use a 10-32 screw and nut to attach the broom clamp to brace.

FINAL INSPECTION

- 1) Round off all sharp corners which could injure the individual or damage people or furniture if hit by the support.
- 2) Adjust ZYGO clamps so that the broom clamp is properly aligned with the cross tube on the main frame of the armrest support. This helps keep the support from bouncing out of the anchor and not returning to the slot when going over bumps. This may require bending or removing the skirt guard on the side that the ZYGO clamps are attached.
- 3) Securely tighten the ZYGO clamps to keep them from loosening and allowing the laptray to fall.
- 4) It is advisable to use a polyurethane finish on the anchor to keep it from weathering. Polyurethane is available at any paint store.

FOLDING COMMUNICATION BOARD
(PORTABLE COMMUNICATION BOARD)

1981



Trace Research and Development Center
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PORTABLE COMMUNICATION BOARD

These instructions will help you construct a 3 panel, folding case with pockets for inserting symbol displays. The board can have plastic pockets on both the front and back, or just the front. Two strap options are also explained. You can alter the dimensions any way you wish.

Materials

- 1 piece 25" x 18" rip-stop nylon
 - 1 piece 12" x 18" clear vinyl
 - or 2 pieces if double-sided board is desired
 - 1 piece 2½" x 28" rip-stop nylon for strap
 - 1 package (about 75") extra wide bias tape
 - Tagboard or heavy cardboard
 - 1 piece 6" x 12"
 - 2 pieces 5½" x 12"
 - 1 gripper/snap set (For strap Option A)
-

STRAP

Option A: Strap is made as a loop, and attaches to board with a gripper, for fast release if grabbed, yanked, caught in a door, etc.

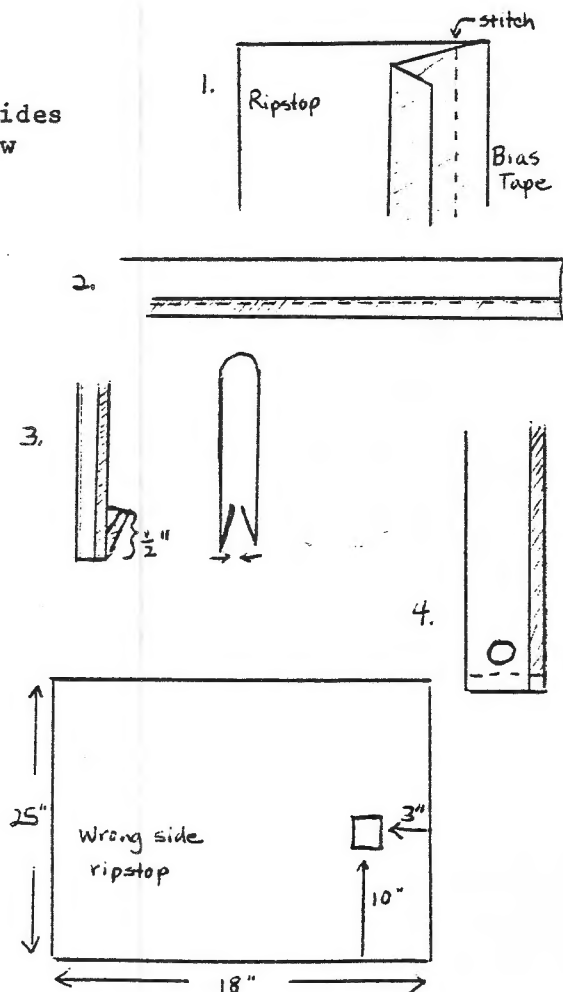
Option B: Strap is sewn directly to board either as a loop or in a purse-like manner.

Both Options

1. Unfold edge of bias tape and with right sides together, line up with edge of nylon. Sew along fold line of tape.
2. Fold nylon, wrong sides together so raw edges meet. Fold bias tape over raw edges and sew close to fold.

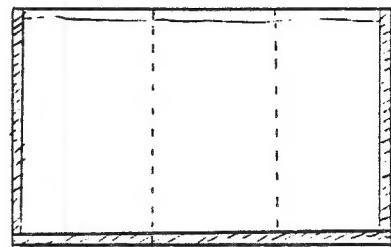
For Option A

3. Fold raw edges of strap ends under ½", place ends together and stitch. The strap is now in a loop shape.
4. Through this double thickness of strap, insert and pound in the half of the gripper set that looks like a button.
5. The other half of the gripper set will be attached to the large rip-stop nylon rectangle. Take a piece of scrap cotton fabric, 2" x 3", fold in half, and placed on wrong sides of nylon as in drawing. (This is to provide a more secure hold for gripper.)

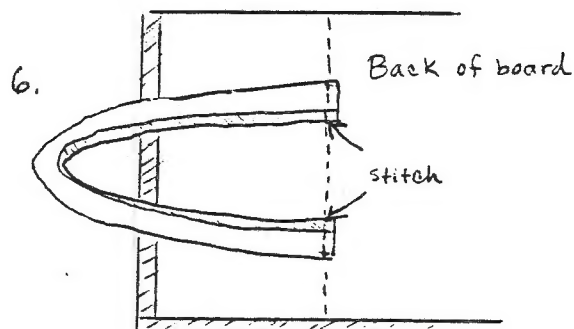


4. Insert cardboard into the pockets formed by stitching, between the two layers of rip-stop. Use smaller cardboard in the middle section.

5. Fold bias tape over bottom edges, making sure that vinyl and nylon are lined up. Clean finish the ends by folding extra $\frac{1}{2}$ " of tape under, as in step 3. Stitch tape to bottom edge.

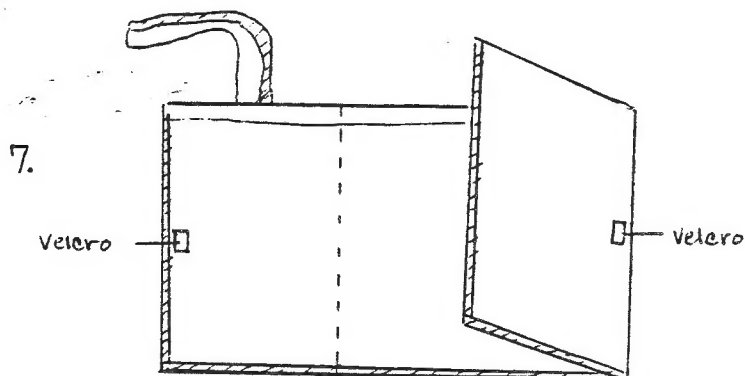


6. To attach Option B straps, sew strap end directly to board at the pocket stitch line on the outside of the board.



7. Fold board, with sides in toward middle. Small pieces of self sticking velcro can be used to keep book closed while carrying.

All clear vinyl pockets can now be used to hold vocabulary sheets.



Bottorf/DePape
4/81